
Space Weather Forecast

Issued on Saturday, 24 September 2022 at 01:26 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales <https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales>

Space Weather Forecast Headline: Chance of Minor Geomagnetic Storm G1 mainly day 3 due to possible CME arrival(s). Daily chance of Minor Radio Blackouts (R1).

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been moderate, with a slow undulation in background X-ray flux in low common-class, with a Moderate class flare observed at 23/1810UTC from a new region on the northeastern horizon. This region was one of six on the current facing side. Satellite imagery in the period was dominated by a large, wide-angled but apparently slow Coronal Mass Ejection (CME), first visible from late morning UTC on 22 September. This CME has been analysed at length and is now thought likely to be related to the then-rapid emergence of a central sunspot region, with the CME inferred as probably parting around the dawn period UTC on 22 September. The latest MOSWOC modelling of this CME puts arrival of this feature around 26/0100UTC, i.e. the turn of the UTC day Sunday 25 September into Monday 26. An earlier faint CME from the southeast of the Sun on 21 September should (narrowly) maintain its independence as a resolved feature, perhaps arriving as a glancing blow just ahead of its sibling later on 25 September. Both events carry low confidence, but are the only CMEs in the forecast at present. A large filament eruption and CME observed around 23/1400 UTC has been analysed and misses Earth, and a CME from the Moderate class flare will probably miss Earth quite comfortably, and has yet to be analysed.

Solar Wind / Geomagnetic Activity: The solar wind was of uncertain character, and may be reflective of a hesitant connection to a slower than anticipated fast wind from a 'coronal hole'. The solar wind speed exhibited a slow decline at first but showed a discontinuity and subsequent rise from 23/1900UTC to reach Slightly Elevated levels. The number of particles comprising the wind was average to slightly above average. The magnetic field associated with the wind was at Weak to Moderate levels. The net result of the above solar wind measures was for provisionally quiet to unsettled geomagnetic activity.

Energetic Particles / Solar Radiation: No solar radiation storms were observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is forecast to be low to moderate, with further common-class flares expected with an ongoing daily chance (50%) of moderate-class flares. The main flare risk remains from the southeastern quarter of the Sun.

Solar Wind / Geomagnetic Activity: This forecast period comprises an initially fast wind, and up to two low confidence CMEs on days two and three (Sunday 25 and Monday 26 September). Of the two CMEs, the second carries a more confident Earth-bound trajectory (although still with significant uncertainty). Current MOSWOC modelling solutions maintain these two CMEs as distinct features (just) with arrivals late in the UTC of 25 September and around the turn of the UTC day of 26 September. These CME should serve to prolong the tail of risk from the coronal

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hole fast wind. The net effect of the above is a peak chance of Minor Storm G1 in the next 24 hours and again between the UTC days of 25 and 26 September, else falling to a slight chance.

Energetic Particles / Solar Radiation: No solar radiation storms are expected, although there is a very slightly increasing risk due to the usual westward advance of the more active sunspot groups across the facing side of the Sun.

Geomagnetic Storms:

Geo-Magnetic Storm	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Minor or Moderate	G1 to G2	No	20	10	30	10
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability			(%)	(%)	(%)	(%)
Active	R1-R2 M Class	No	50	50	40	40
Very Active	R3 to R5 X	No	5	5	5	5

Solar Radiation Storms - (High Energy Protons):

Radiation Storms	Level (cm ⁻² sr ⁻¹ s ⁻¹)	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Active	≥ S1	No	5	5	5	5
Very Active	≥ S3 *	No	1	1	1	1

Radiation Storms	Level (cm ⁻² sr ⁻¹ s ⁻¹)	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Active	≥ S1	No	5	5	5	5
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = cm ⁻² sr ⁻¹ s ⁻¹)						